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ABSTRACT

A study tested the English vocabulary and reading comprehension of about 1,500 Japanese college and university students and compared three different media formats for teaching vocabulary in English-as-a-Second-Language (ESL) in a number of Japanese college classes: commercially available and teacher-adapted computer software; traditional text-based reading and vocabulary instruction; and the audiolingual/language laboratory method. Results support the hypothesis that reading comprehension will improve in direct proportion to vocabulary knowledge and indicate differential effects of the three teaching methods. Long-term vocabulary retention was noted when one set of materials was used in all three media. The article concludes that teachers can improve vocabulary instruction by: having students practice with an intense, concentrated quantity of new essential core vocabulary, met in a broad variety of new contexts; stimulating activation of associative memory networks; maximizing active student acquisition of new words and activating passive vocabulary through maximum productive or generative use; and following the five essential steps in learning any new vocabulary. Contains 15 references. (MSE)

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Designing and Testing Vocabulary Training Methods and Materials for Japanese College Students Studying English as a Foreign Language

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Abstract

The chief hypothesis of the author's dissertation (Loucky, 1996a) was that EFL students' reading comprehension would increase significantly in direct proportion to increases in their English vocabulary levels. This major hypothesis was supported by initial pilot studies done by the writer as well as by a consensus of L1 reading researchers, shown by a survey of literature in the field (For such a review see almost any text on the teaching of reading or Chapter 2 of Loucky, 1995a, "Designing and Testing Vocabulary Training Methods and Materials for Japanese College Students Studying English as a Foreign Language.") However, just *how* L2 learners, including Japanese college students in particular, access and acquire new lexical meanings and *how* increased vocabulary knowledge relates to their development of more advanced English reading comprehension skills has not been adequately studied. Therefore, we proposed to study the relative strength of this perceived relationship between students' L2 vocabulary ability and acquisition in particular and their development of English reading and listening comprehension skills in general. These were the motivating factors for this extensive study of about 3,000 students in various majors at several Japanese colleges over seven years.

INTRODUCTION

First, this study sought to assess average vocabulary and comprehension levels of Japanese college students to better determine more effective means of instruction for more rapid and successful language learning. Second, various vocabulary training methods and materials were examined, particularly a series of workbooks known as *Wordcraft*, produced by Vocab, Inc. Vocabulary lessons were taught based on these materials, using three different media formats. Third, these were then compared to determine their relative effectiveness in helping students to increase their vocabulary, comprehension and listening comprehension levels. The relative importance of these three essential language skills for developing more general, overall English proficiency was also examined. In addition, the potential of using Computer-Assisted Instruction (CAI) for more effective, individualized instruction was carefully considered.

Evaluations and subsequent recommendations were based on the use of author-designed vocabulary training software, primarily con-

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structed based upon Wordcraft's original tape-workbook format. The use of these vocabulary development materials was compared in these three media settings: 1) using them as traditional silent-reading texts, with a "Sustained Silent Reading (or SSR approach); 2) using them in a language laboratory, with the Audio-Lingual Method (ALM approach); and 3) using author-designed Computer-Assisted Instructional software (CAI approach) in a Macintosh laboratory. In addition to a short-term Wordcraft study done with three groups in the author's two rapid reading classes, a long-term comparison of reading improvement was made between these two classes, which used several Audio-Lingual and Computer-Assisted programs over the course of the school year, and two traditionally taught, text-based rapid reading classes also being taught at Seinan JoGakuin. Results and practical recommendations are then given for EFL reading and vocabulary development, based upon actual results of these longitudinal studies, as well as practical vocabulary learning experiments with various Japanese college students at six different schools. Periods of instruction were generally ten months, or one entire academic year at various Japanese colleges.

Next, implications of these findings in the field of second and foreign language reading instruction to the more general field of second language acquisition are suggested, with a particular focus on improving English vocabulary learning in Japan. SLA in brief seeks to show how language learners' internal processing relates to both their linguistic input and output. Finally, this dissertation also helped to show that a more definite system of vocabulary development is very much needed, and would be very beneficial for English students in Japan. Applications were also made to comparable language teaching/learning situations in other parts of the world.

STATEMENT OF RESEARCH PROBLEM

Some English teachers make the claim that students' proficiency in the English language can be rapidly developed if one can just get students to talk more. They seem to think that increased fluency in English can be accomplished by merely decreasing class size or increasing the number of conversation classes which students are required to take. However, types of instruction and interaction that most help to facilitate language learning need to be investigated, based upon actual research in the field of Second Language Acquisition (SLA). So far, this has not been done adequately in the four skill areas. Although some language teachers and schools in Japan think that all students really need is conversation (however that vague, general term is defined), the barrier of low vocabulary levels has not been faced squarely and is seldom addressed. Yet it is commonly known that effective cross-cultural communication--whether written, spoken, read or heard--depends on having both an adequate background knowledge, and a sufficient vocabulary in the second language being used. Thus one must look at the interrelationships between all four basic communication skills--of listening, speaking, reading and writing--and then compare their relative importance in the development of foreign or second language proficiency in English (EFL/ESL). The author's dissertation research was directed to this end, with a particular focus on developing and testing vocabulary-training methods and materials for Japanese college students studying English as a Foreign Language. A summary of his study samples, method, results and recom-

mendations follows.

METHODS AND SAMPLES

This study was done using three different media formats to examine three types of vocabulary training methods and materials. These were specifically the following:

(1) *Wordcraft*, tape-workbooks made by Vocab, Inc. The first five lessons of Book 1 were put onto a Hypercard format by the author to compare its relative effectiveness as CAI media.

(2) *Shinbun, Shinbun*, by Bob Moore, recently renamed *Wordworks*, available from Seido.

(3) Crow's "Semantic Field Keyword Approach."

The basic purpose of this research was to design and test vocabulary training computer software at the appropriate level of instruction for the average Japanese college student learning English as a Foreign Language (EFL). Such software programs were compared with traditional text-based reading and vocabulary instruction, as well as with the Language Lab's typical Audio-Lingual Method (ALM). The research design of this study included the following steps and procedures. There were three major objectives to this study. First, average English reading vocabulary and comprehension levels of Japanese college students were assessed. Norms were computed for different majors and schools. These are presented in the dissertation appendices in three ways: 1) in detailed class profiles, with individual student scores and class averages, along with 2) graphs of each class, showing the relative levels of individual student "vocabulary, comprehension, and total reading levels," (or R.L.) as compared with other linguistic measures, and 3) a composite Kyushu Colleges Summary Chart of average scores for various Kyushu colleges and majors was included. (Details are all included in dissertation available now from UMI Dissertation Services.) Average reading levels for colleges tested were generally between grades 3-6, relative to native reader norms.

Secondly, the following three vocabulary training methods and materials were examined. CAI lessons were developed by the author from *Wordcraft*, Book 1: Lessons 1-5, as well as from Crow's Keyword Approach. In addition, a commercially available software program was used named *Shinbun, Shinbun: Vocabulary Expansion Through Newspaper Readings* (Moore, 1995). Vocabulary lessons were taught based on these materials using the three different educational media described above to determine if one media of instruction was more effective in motivating and helping students to increase their vocabulary, reading and listening comprehension levels. The relative importance of these three essential language skills for developing students' overall English proficiency was also evaluated by comparing pre- and posttest measures of students' subskills in grammar, vocabulary, comprehension, and listening. All three approaches used a contextualized approach to teaching new words. That is, new words were taught and learned in the context of interesting stories, and not out of context.

Thirdly, by comparing three different educational media, this study sought to determine whether using one particular type of media for vocabulary instruction would have any greater effectiveness than another in helping students to achieve more rapid retention of new words, and by implication, more successful foreign language learning. Specifically, the three educational settings examined were: 1) vocabulary workbooks or handouts used as traditional, Sustained Silent Reading

texts; 2) workbooks or handouts used in a laboratory with the Audio-Lingual Method; or 3) putting the same material on computer screens, by using author-designed CAI software in a Macintosh computer room. Naturally, the potential of using Computer-Assisted Instruction for providing possibly more effective, individualized language learning opportunities was being considered. However no media was shown any preference before students. Later evaluations and recommendations are based on the use of these and other newer programs since then. In this study there were two author-designed vocabulary-training software programs, as well as one commercially available program, *Shinbun, Shinbun*. All three of these were constructed using a Hypercard format. The writer based one five-lesson program upon Wordcraft's original tape-workbook format. The second four exercise program he designed based on Crow's Keyword or Semantic Field Approach. Parts of all three of these materials were presented in three different media formats and vocabulary learning rates were compared. This study thereby sought to determine whether Japanese college students using Computer-Assisted vocabulary development software would show a better rate of improvement or long-term retention than those students using either an Audio-Lingual or Sustained Silent Reading method of vocabulary acquisition. Pre- and posttests measured students' initial and post-study knowledge of fifty words presented in *Wordcraft* lessons 1-5, as well as *Shinbun, Shinbun* words, and 36 key-word groups (36 X 5 meanings=180 words) from the History chapter of Crow's *Vocabulary for Advanced Reading Comprehension*.

Pre- and posttest knowledge of vocabulary in these lessons was assessed and rates of improvement or learning were compared for each media and instructional material. These improvement rates were further compared for Wordcraft study between pre-test and both short-term and long-term retention situations by means of ANOVA for the three media being studied. Besides these three short-term studies, year-long comparisons were made of all four Rapid Reading classes to see if ALM/CAI-enhanced classes learned vocabulary and improved in their English reading levels at a significantly higher rate than traditionally taught text-based classes did. Improvement rates from pre-test to both short-term and long-term posttest situations were then compared by means of ANOVA for the four groups of Seinan English majors studied:

1) Treatment Group 1, CAI (Class 1F, A);
2) Treatment Group 2, ALM (Class 1E, B); and
3) Treatment Group 3, CAI, Class 1EA, as compared with 4) the Control Group, using a traditional SSR approach (Class 1F, B). A refers to first-half, B to second-half of class.

RESULTS

The results of pre-testing the reading levels of over three thousand first, second, and third-year college students at six different schools were as follows. Almost all of the students tested, with the exception of English majors at one of the best four-year colleges in Kyushu, showed rather low vocabulary levels as tested by the Gates-MacGinitie standardized reading tests. These are summarized below. (More detailed extensive tables of both individual Japanese college students' scores and also average class reading scores are shown in the dissertation appendices.) Students tested originally between 1991 and 1993 are listed below, with a basic description of their average levels. Due to teaching constraints, samples were either whole or half-class samples.

Sample 1: 84/137, or 61.31% of the students at a technical two-year school, Kita-kyushu Shushoku Tanki Daigakkou, were tested. Their average levels were: a) 3.85 in vocabulary, b) 2.51 in comprehension, and c) 3.16 in their total expected reading level ("R.L." in 9/91).

Sample 2: 37.27%, (41/110), of the third-year Engineering students at Fukuoka University were tested. Their levels were as follows: a) 3.61 average vocabulary level, b) 2.06 average comprehension level, and c) 2.75 average total Reading Level ("R.L." as of 12/2/91).

Sample 3: 4.61%, (25/500) of the first-year Law students at Fukuoka University were also tested, with the following results: a) 4.09 average vocabulary level, b) 2.97 average comprehension level, and c) 3.53 average total Reading Level ("R.L." as of 12/2/91).

Sample 4: Also tested on October 16 of 1991 were 40 freshmen students present out of a class of 51, at Seinan Jo Gakuin, averaging 5.96 on the vocabulary section of the Gates-MacGinitie Reading Test, Level F, Form 1. A percentage breakdown of their raw scores follows. The lower twenty-three of these forty students, or 57.5%, had a vocabulary level less than grade 6.0. The top seventeen out of these forty students, or 42.5%, however, were between a 6.0-8.0 vocabulary level. On the lower extreme, five out of forty, or 12.5%, had vocabulary levels less than 4.6 (ranging between 4.0-4.5). Only the top two students, or 5%, were at an 8th grade vocabulary level. Average reading levels have been falling ever since. These forty Seinan Jo Gakuin first-year students, or 13% were checked after one semester of college English instruction. Only their vocabulary was checked, and it was found to average 5.96, roughly equivalent to that of an American student at the start of sixth grade. This was only a measure of their reading ability, of course, and not of their speaking or listening ability.

Sample 5: One of the author's second-year Seminar classes was assessed as to their reading levels in April 1992. In 1992, 22 second-year students began the year with these reading levels: a) 4.38 average vocabulary level, b) 4.84 average comprehension level, and c) 4.5 average total Reading Level ("R.L." as of 4/23/91). These close measurements seemed to strongly support the hypothesis that foreign language learner's vocabulary levels are such an important factor that they tend to both limit and determine their language development, especially in the area of reading comprehension.

In the spring of 1993, the author was also asked to assist in the testing of all first-year Engineering Department students at the largest four-year engineering college in Kyushu, known in English as Kyushu Institute of Technology in Tobata. The Gates Test he introduced has been used ever since in a modified form to help assess student's incoming levels to divide into more homogeneous classes. At that school 265 freshmen were tested as to their vocabulary levels only. Another 150 students in six different classes were also given the complete test, including comprehension, so that total reading levels could also be computed. The results at this school, "K.I.T." for short, were as follows:

Sample 6: 265 freshmen at Kyushu Institute of Technology were found to have an average vocabulary level of 4.24.

Sample 7: 150 K.I.T. freshmen who took both the vocabulary and comprehension sections showed the following averages: a) 3.81 in vocabulary, b) 3.16 in comprehension, and c) an average total Reading Level of 3.4b ("R.L." as of 4/93).

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Sample 8: All 315 freshmen students (n=100%) were tested at Seinan Women's Junior College in April of 1993. Their average scores were as follows: a) 4.03 in vocabulary, b) 3.66 in comprehension, and c) 3.86 in average total Reading Level, as of that date. A posttest was given at the end of the academic year, in February, 1994 to determine the average increase in each of these levels, and to compare classes which used different methods and materials. Only one of these classes used the Wordcraft materials, but then only with either ALM or silent reading (SSR) approaches, as it was a pilot study before software was designed.

Sample 9: Twenty second-year Seinan 1994 Seminar students were tested, showing the following averages: a) 4.38 in vocabulary, b) 4.39 in comprehension, and c) 4.37 in total reading level (data computed using Microsoft Excel Program). These figures seem to show a close link between students' English language vocabulary level and both their L2 comprehension and total reading levels. In fact, the measurements in this class were so close that they gave support to the hypothesis that foreign language learners' vocabulary levels are so important that they tend to limit and determine the rate of their second language development. This is especially true in the area of reading comprehension, and seems to be true in the area of listening comprehension development as well. (Clear relationships were consistently observed between vocabulary, reading speed, and listening improvement at Kitakyushu University when using Wordcraft and TOEFL Listening tests as teaching and testing materials, assessed periodically using SONY's computerized LL test analyzer.) The author's seminar is designed to help students develop their reading, listening and vocabulary skills while reading or hearing interesting stories about people who helped Japan to develop. One text used is his study entitled *Famous Leaders Who Influenced Japan's Internationalization*, (1995).

Samples 10-13: 120 first and second-year Kitakyushu University English Literature and Foreign Language Department students were also tested. These results are divided by their respective class periods. All of the classes at this school showed average comprehension levels that were considerably higher than their average vocabulary levels. This is to be expected of adult language learners, whose knowledge of the world far exceeds their average vocabulary level in a foreign language. Henceforth Kitakyushu Daigaku classes are abbreviated as 'KKD.'

Sample 10, or 'KKD/Period 1' showed the following results: a) in vocabulary, an average of 4.73, b) in comprehension, an average of 5.12, and c) an average Reading Level of 4.86. These were second-year students.

Sample 11, or 'KKD/Period 2' showed an average of a) 5.33 in vocabulary, b) 5.47 in comprehension, and c) 5.48 in their total Reading Level. These were freshmen.

Sample 12, of 'KKD/Period 3' showed the following results: a) an average vocabulary of 4.96, b) an average comprehension level of 4.99, and c) an average total Reading Level of 4.96. They recognized an average of 59.57% of the words listed in Nation's (1995) Headwords test.

Sample 13, or 'KKD/Period 4', showed an average of a) 5.1 vocabulary, b) 5.6 comprehension, with a c) total average Reading Level of 5.3. All of these were assessed in April, 1993. Further TOEFL Listening section test scores, and Wordcraft vocabulary 'improvement rates,' as well as Michigan Proficiency scores are shown in detailed tables and graphs in the dissertation.

Sample 14. At Kitakyushu University, 1994-1995, three rapid reading classes of about twenty International Relations second-year students each were taught by this researcher. These three classes were given only the Gates C vocabulary pre-test at the beginning of the year. Scores were compared with Gates F post-test in all three areas of reading, however. These students took a Michigan Proficiency Test A, and were also assessed for improvement in their reading speed. This was done by taking three reading speed measures using Rand's (A Beka Book) *Adventures in Greatness* text: 1) an initial reading speed, 2) the highest speed reported on the progress record page, and 3) a words per minute improvement rate was calculated by finding the difference between these two. Results for each of these three classes are shown in dissertation graphs entitled "JPL Kitakyushu University Rapid Reading Class 1-3, individual and class Average Improvement Chart (1994-95)," and also on charts (Kitakyushu University, 92-94, Speed reading 1-3). Results were as follows:

Table 1: Pre-and Posttest Reading Levels at Kitakyushu Daigaku (1994-95)

PRE-VOCAB LEVEL	POST-VOCAB	POST-COMP	FINAL READING
SR1--4.33	6.65	6.82	6.6
SR2--4.27	7.43	8.12	7.66
SR3--4.41	7.57	7.79	7.62

Class average improvement rates in total English Reading Levels as calculated from these findings were very sizable. These three classes at Kitakyushu University improved an average of three grade levels in their Reading Levels (2.97), in ten months of instruction with the author. By class, improvement rates were as follows: 1) SR1-- 2.31 grades (relative to American school norms), 2) SR2-- 3.4 grades, and 3) SR3-- 3.21 grades.

Sample 15. Thirty-four technical college students were assessed as to their Reading Levels at Denki Daigaku, or Electrical College, in January of 1994. Their levels were distinguished into two categories, for males and females tp check whether the English level of males at vocational schools is actually much lower than that of females as is often thought. Males had an average vocabulary level of 2.76, an average comprehension level of 2.21, and an average reading level of 2.50 in English reading ability after one year in college. They had only four months of English instruction, stressing oral conversation. Females had similar levels, having a 2.67 average vocabulary level, 2.43 average comprehension level, and similar average reading level, at 2.51 grades.

Sample 16. Two-thirds of all first-year students (n=215 or 67%) were tested at Seinan Women's Junior College in April 1994. Their class average pre-test reading scores are given.

Table 2: Average Pre-test Reading Scores in Seinan JoGakuin Reading Classes (4/94)

CLASS NAME:	VOCAB LEVEL:	COMP. LEVEL:	READING LEVEL:
1C	3.93	3.22	3.58
1D	3.83	2.99	3.42
1E	2.05	3.17	2.44
1F	2.05	3.6	2.52
AVERAGES:	2.96	3.24	2.99

Average starting English reading levels were as follows: a) about at grade three (2.96) in vocabulary, b) 3.24 in comprehension, and c) at about grade three (2.99) in average total Reading Level, as of that date. A posttest was given at the end of the academic year, in February 1995, to determine average improve-

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ment in each of these levels, and to compare classes which used only text-based reading methods and materials, with media-assisted classes of the author. Reading improvement rates are given in far more detail in the dissertation results and tables.

Sample 17: Kyushu Institute of Technology, 1994-1995, 21 Engineering first-year students. During the 1994-1995 academic year, engineering students in a general English class taught by the author improved by an average of 1.38 grades, or showed about one year and four months growth in their vocabulary levels. The class vocabulary average at the start of English 101 was at about the third grade level (2.99), relative to native norms. The author's class ended with a 4.37 vocabulary level, about a fourth-grade comprehension level (3.85), and their post-test total reading level was also at the start of fourth-grade (4.03). In the previous 1993-94 academic year, however, results at K.I.T. were as follows. Nineteen engineering general English classes' starting vocabulary levels were assessed with the Gates-MacGinitie Reading Test, Form C. Average vocabulary level for about five hundred engineering students was: 4.24 grades. Six classes were also assessed as to their comprehension and total reading levels on this same test at the beginning of the academic year. The averages for these six engineering classes at Kyushu Institute of Technology were: 1) 3.8 in vocabulary, 2) 3.16 in comprehension, and 3) 3.46 in their total reading level. Wordcraft, Book I, used only as a workbook also was shown to be an effective tool for helping these students to improve their knowledge of English vocabulary.

INITIAL FINDINGS

The intensive vocabulary training methods and materials used in this study clearly seem to have been successful in teaching Japanese college students how to learn and remember new English vocabulary words. As expected and predicted by our original hypothesis, student's comprehension also improved considerably as more vocabulary words were mastered. After initial testing of three vocabulary training media, other lessons were done using audiolingual method tapes. The author's very large rapid reading classes at Seinan were only divided into four different instructional media groups for the first five lessons of Wordcraft during the second month of school. After that large classes had to be instructed as a whole, so rapid reading classes C and D, characterized mainly by traditional text-based methods, were designated as "SSR," short for meaning teaching reading using mostly the Sustained Silent Reading method. Classes E and F, being characterized mainly by more innovative audiolingual and computer-assisted methods were labeled as "ALM/CAI-Enhanced" classes.

Students simultaneously read and listened to subsequent Wordcraft lessons 6-30, also learning these words first in the context of short, cross-cultural and historical stories. New words were given in sentences first, then the sentence was repeated, substituting definitions for these new words. Three practice quizzes followed each lesson, using new words in different whole-sentence contexts. Students were encouraged to listen actively, and write down new meanings on word cards for later review. They were also told to write down English definitions, and only if they needed to check the meaning in their native language to wait and look up Japanese meanings at home later on. As students became familiar with this approach, they began to study and anticipate the meanings of new vocabulary words more quickly.

Although this study focused primarily on second language vocabulary development, experience shows that the development of these skills is often better done in an integrated manner, or simultaneously along with students' learning and development of other English communication skills (including listening, writing/ keyboarding skills, and speaking skills). Such a balanced, four-skills approach was also preferred by many students, as reported on English Interest Surveys administered as part of the study (Loucky, 1995: 145-55; 291-95). Having students write "Vocabulary Stories," for example using target vocabulary, encouraged students to develop their writing skills, which gave them more to talk about in class at a more complex level.

Improvements in many of their scores in the latter half of the first semester show that students began to independently learn new words even before pre-tests or lessons, although not required to do so. In brief, students learned HOW TO LEARN new English vocabulary more effectively. Although pre-tests showed little variance in initial difficulty, students naturally began to learn what was expected of them, and tended to know how to study new words better on later Wordcraft lessons. This was both an expected and hoped for result, aided by intensive use of a Sony language lab which enabled us to do testing and give immediate feedback each week. Results show that students learned how to learn new words, became better prepared or motivated, and thus performed better on later tests. Naturally, both the "practice effect" and also summer vacation helped them to have time to improve their vocabulary as well.

Once students learned the Wordcraft approach to learning new vocabulary, they tended to do better on both pre- and posttests. At both Kyushu Institute of Technology and at Kitakyushu University, where Macintosh computer rooms were not available to this researcher, Wordcraft lessons were taught with tapes, using the Audio-Lingual Method. At all three different Japanese colleges where *Wordcraft* lessons were used it seems that the variety of Wordcraft's stories and quizzes clearly helped students to develop stronger vocabulary learning strategies. Perhaps the primary strength of Wordcraft's design is that its lessons give students five chances to learn each new word, four times using contextualized vocabulary in a variety of different settings.

RESULTS SUMMARIZED

The major hypothesis of this study was that students' reading comprehension would increase significantly in direct proportion to increases in their English vocabulary levels. This expected outcome occurred in both regular text-based classes as well as in more ALM/CAI-enhanced classes. As expected, to the extent that students improved in their vocabulary levels, their comprehension levels also improved. The amount of increase in both vocabulary and related reading levels differed significantly between these two types of classes and instruction, however. For the purpose of comparing gains statistically, both class 1C and 1D were combined as "Control Sustained Silent Reading Group." Classes 1E and 1F were combined as "ALM/CAI-enhanced Treatment

Table 3: Comparing English Reading Level Gains at Seinan JoGakuin (1994-95)

Predominant Teaching Media	Average level gains were:
A. For ALM/CAI classes	1) 1E--3.17 grades 2) 1F--3.15 grades
B. For SSR classes	3) 1C--1.80 grades 4) 1D--2.31 grades

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Group." Their average reading levels (using Gates-MacGinitie standardized reading tests) and improvement rates are shown here.

Text-based 1C class averaged 1.8 grades improvement in their total reading level. This was made up of a (1) 1.89 grade level average improvement in their vocabulary levels, and (2) 2.02 grade levels average improvement in their comprehension levels. 1D class, doing somewhat better, averaged a 2.31 grade level improvement in their overall reading level. This was comprised of a (1) 2.68 grade level improvement in students' average vocabulary levels, and a (2) 2.14 grade level improvement in their average comprehension levels. Classes 1E and F, which were exposed to a variety of all three media of instruction during the course of the year, clearly did significantly better in terms of improving their overall English reading levels. Based on a much more sizable increase in their English vocabulary levels, they showed about twice as much improvement in this area. This sizable improvement in their average vocabulary levels led to a significantly greater amount of improvement in their average total reading levels. Comprehension areas were not shown to vary greatly, but this may be due to the high level of difficulty of the reading passages on the test. Class 1E showed an average improvement in their total reading level of 3.17 grade levels, comprised of a (1) 4.14 improvement in their average vocabulary levels, and (2) 2.15 grades of improvement in terms of comprehension. Class 1F showed an average improvement in their total reading level of 3.15 grade levels, made up of a (1) 4.03 improvement in their average vocabulary levels, and (2) 1.86 grades improvement in their average comprehension levels.

There seemed to be a sizable difference in the amount of improvement in vocabulary levels in both 1E and 1F classes, when compared with ordinary SSR text-based reading classes 1C and 1D. Not only did the author's classes use more audio- and computer-assisted instructional materials, but they were also taught with a more intensive stress on vocabulary development, by requiring students to listen to, manipulate and learn 50 new words per week. This approach clearly seems to have worked well. In fact, both classes improved more than four grade levels (4.1 average) in their English vocabulary levels. This was about twice as much improvement in average vocabulary level as that found in text-based classes, which also improved, but by an average of 2.3 grade levels instead. ALM/CAI classes improved over two grade levels more in vocabulary on average, and by 1.1 grades in their overall reading levels more than SSR classes did. Although students in all four rapid reading classes improved in their comprehension levels as their vocabulary ability increased, the ALM/CAI classes showed a much more marked improvement in both their vocabulary and overall reading levels than did classes using more traditional, text-based reading approaches. Classes E and F's larger amount of improvement seems to have been mainly due to the use of a greater variety of more intensive and interactive vocabulary training methods and reading instructional media and materials. Statistical analysis shows that their gains in both vocabulary and overall reading level after one year of instruction were significantly higher than those of students whose reading classes primarily used a text-based method.

These clear indications of great improvement in English reading levels on a much harder and more detailed posttest may also be interpreted as strong evidence in support of a more varied, multimedia approach to foreign language vocabulary development for Japanese college students. Standardized reading tests

such as the Gates tests used also seem to be far more valid measures for these students than TOEFL or Michigan tests, which are normally intended for much more advanced international students who attend or intend to enter American universities. Such tests have a different audience in mind, and therefore have very limited value for testing junior college students, who are only at a beginning to intermediate level in their speaking, listening and vocabulary skills. TOEFL and Michigan tests thus seem to be rather inadequate for measuring the gains made by lower level foreign students in English listening, grammar and reading improvement. Gates Reading Tests have yielded very consistent results at six different institutions of higher education in Japan, when used by the author with over 3,000 students. They are clearly much more helpful both in placing students according to reading ability, and also in diagnosing particular areas of strength and weakness in the reading skills of each individual student. Such tests should be used regularly, otherwise neither individual problems or progress, nor general annual trends can be clearly detected, proven or shown.

DISCUSSION: EFFECTS OF COMPUTER-ASSISTED VOCABULARY TRAINING

This research began with a simple desire to compare three different media formats for helping Japanese college students in their English vocabulary instruction. It has helped to clarify the fact that multimedia instruction, though more enjoyable for most students, is not always automatically more effective. However, a more complex research design would be recommended for future studies which examines the factors which contribute to a software program's effectiveness. Specifically, what factors in the design, style, content, and application of any particular software cause it to be more or less growth-producing in terms of English vocabulary development? This is the central question which must be kept in mind when evaluating the degree of effectiveness of new language learning software. The ultimate conclusion of this study is that merely using more multisensory instructional media does not, in and of itself, necessarily guarantee that more language learning or vocabulary acquisition will automatically take place. A great deal depends on the type and quality of instructional programs, regardless of whether they be text-based, tape-based, or more multimedia computer-based materials and media of instruction. These findings coincide with Kohlich's study (Kohlich, 1991) of Davidson's "Word Attack" software. She stated that one must determine what specific aspects of any program of instruction make it more effective.

In the case of this study, three different computer software programs were compared as to their relative effectiveness for vocabulary training of Japanese college students in several different media settings. Two of these computer programs were designed by the author, using a Hypercard environment format, and two were examined in three different media settings. The research objective was to determine if a computerized instructional environment, per se, would tend to be more effective for second language vocabulary learning. Specific findings were as follows:

In the Seinan reading classes of 1994, the traditional Sustained Silent Reading Control Group (1F, second half of the class, within Sample 16) had the highest average improvement rate on Wordcraft Lessons 1-5, with 31.6%. This may be explained by the fact that students are more familiar and comfortable

with this method, and that they could concentrate more on the reading task, rather than being distracted by having to learn the new processes involved in using a new computer software program, or in listening to lesson tapes as freshmen in a new computer room school setting. Second highest in its improvement rate was IF, CAI Group, (class first half) with 30.26%. Third was IE, CAI Group, (first half), with 29.12% improvement. The lowest learning rate was shown by the ALM Group, IE, (second half of the class) with 27.33% improvement. Whether these are significant differences, due mainly to a difference in instructional media used, or whether these differences are due to other factors was hard to say. Therefore, averages for each class were compared. In such a case, the differences were seen to be only 1.34% for IF class, and about 2% (1.79%) for IE class. These did not appear to be very significant differences. Indeed, statistical analysis did not show any either. When a 3 X 3 ANOVA study was done of the Wordcraft results, no significant differences were shown statistically. ANOVA Subtable A compared pre-test base levels with both short- and long-term Wordcraft memory, factoring for both treatment method and time differences for Groups FA/CAI, EB/ALM, and FB/SSR. ANOVA Subtable B compared both pre-test, short- (within one month) and long-term memory (three months after instruction) Wordcraft scores with percentage of improvement rates shown for both short- and long-term memory tests. It considered both factors "A Treatment," and "B Time," for Groups FA/CAI, EB/ALM, and FB/SSR. (See Ed. D. Table XVI Statistical Analyses, Part A, "Comparing Wordcraft Media Results by ANOVA.")

Clearly, a longer study with more improved vocabulary training software would be necessary to ascertain whether CAI methods and materials are not in fact superior or more effective in the long run for teaching a larger number of words more quickly with a higher rate of recall. Such a longitudinal study is highly recommended, using such a program as *Word Attack*, which contains about 3,000 words at an intermediate to SAT level. For such a study, however, more memory would be required than the present computers have. Since a few of these computers have since been replaced with computers having CD-ROM readers and ability to read high-density discs, such a study may now be possible on a small scale. Until such a study is done, one can only surmise based on tendencies observed so far. It would also be fairer to study students who already have computer skills developed.

Two outstanding educational features which appeared when using this Wordcraft vocabulary training material, regardless of the media used, seem to be a uniform improvement in students' long-term measure of memory. However, this may also be explained by the fact that the second test came after a long summer vacation, which gave students two extra months to study. All groups also had a relatively high retention rate, as follows, for all three class groups. Three class group averages on the Wordcraft long-term memory posttest were 1) EB (ALM)-- 86.5%; 2) FA (CAI)-- 85.4%; and 3) FB (SSR)-- 85.38%. The average long-term retention rate for all four class halves combined was 84.55%, a very good learning rate, especially considering they had an average knowledge of just 54% of these fifty words originally. This is an average learning or improvement rate of 30.55% for all class sections, quite a good learning rate.

These students' high levels of word meaning retention would seem to indicate both the high quality of the vocabulary training

materials used, ease of learning from them, and also good quality of study in these students, despite having eight weeks off from school. Because of this long vacation, students were informed that they would be tested again on some of the 300 vocabulary words from all 30 Wordcraft lessons. Which lessons or words they would be tested on was not specified, however. As might be expected after a longer period of study, this posttest of long-term memory seemed to show very good quality in terms of the amount of new English word meanings learned and retained for almost all of the Japanese college students tested.

Similar results were obtained on other Wordcraft tests using only an Audio-Lingual Method or only a text-based method (SSR), at both a four-year college, Kitakyushu University, and at K.I.T. among engineering students. K.I.T. Engineering students in the author's classes in both 1993-94 and 1994-95 academic years showed steady improvement in learning the vocabulary from Wordcraft, Book 1. In 1993-94, for example, they had an average improvement rate of fifteen percent over all thirty lessons, covering three hundred words. In the 1994-95 academic year, only post-tests were given. Each time students achieved about 90% mastery, except for the last test.

PRINCIPLES OF VOCABULARY ACQUISITION OBSERVED

Both this study and other extensive research studies have shown that language learner's vocabulary levels strongly correlate with their reading comprehension and proficiency levels, which many language teachers consider to be the most important academic skill for success at the university level. As Beglar and Hunt (1995) noted recently at JALT '95,

> Drawing from L1 reading research, Chall (1991) states that readability measurement has shown consistently for more than 70 years that vocabulary difficulty is the best predictor of comprehension difficulty (Chall and Stahl, 1985; Thorndike, 1973-4). Stated differently, we can say that vocabulary difficulty has a higher correlation with reading comprehension difficulty than other factors such as syntax and organization ... (Chall, 1985; Klare, 1963; Lam, 1985). This holds true for L2 learners as well. Brisbois (1992) has shown that vocabulary scores are the primary factor contributing to L2 reading scores for both beginners and higher level students. Vocabulary knowledge has been found to be a better predictor of L2 reading ability than general English ability to such an extent that learners who know less than 3,000 word families cannot succeed academically while those who know more than 5,000 word families are extremely well-positioned for success (Laufer, 1992). Given the importance of having an extensive vocabulary for academic success, instructors should consider what vocabulary to focus on by considering word frequency and diagnostic test results of their learners (Harlech-Jones, 1983). Then, they can develop a principled vocabulary development program using both indirect and direct teaching methods to expand the learner's vocabulary size, depth, and fluency ... [to] assist learners in acquiring the vocabulary they will need in the shortest possible time.

For this reason all language teachers should devote much time to helping students build up their vocabulary levels, integrating

new terms into actual productive communication. Other major principles of foreign language vocabulary acquisition which should be carefully followed to maximize formal language teaching as well as informal learning situations can be listed here to keep in mind. Students in classes using a greater variety of vocabulary instructional methods, media, and materials, such as the author's reading classes E and F, improved at a significantly higher rate than did students in traditional text-based classes. Based on this study at many colleges and upon observation after 15 years of teaching in Japan I have found that applying the following principles can help maximize language learners' vocabulary acquisition and retention. Teachers could also help language learners to improve their target language vocabulary much more rapidly, as these rapid reading students especially did, by improving intentional and intensive instruction in vocabulary acquisition strategies, and by helping students to:

1) PRACTICE WITH AN INTENSE, CONCENTRATED QUANTITY OF NEW ESSENTIAL CORE VOCABULARY, MET IN A BROAD VARIETY OF NEW CONTEXTS. Stress concepts and terminology necessary for higher level academic study in English. (EAP)

2) STIMULATE ACTIVATION OF ASSOCIATIVE MEMORY NETWORKS, or the brain's metacognitive conceptual schemata via use of both multisensory and multimedia-assisted instruction, including use of more:

(a) Interactive audiolingual stories in interesting cross-cultural situations, (b) Interactive videos, (c) Interactive computer software programs, (d) Interactive and communicative classroom activities and groups.

3) MAXIMIZE ACTIVE STUDENT ACQUISITION OF NEW WORDS, and ACTIVATE PASSIVE VOCABULARY VIA MAXIMUM PRODUCTIVE OR GENERATIVE USE as much and as soon as possible. Change language-learning tasks/pairs/groups often.

4) FOLLOW THE FIVE ESSENTIAL STEPS TO LEARNING ANY NEW VOCABULARY. These are summarized below, in five steps taken from Hatch and Brown's recent text entitled *Vocabulary, Semantics, and Language Education* (Hatch and Brown, 1995: 374). Students should try to practice and use the five steps essential to learning any new words or phrases in any language as much and as often as possible. The more new vocabulary phrases and language forms one can move through each of these steps, the more one will learn and remember. These five essential steps are:

(1) Encountering new words or phrases, (2) Understanding the word's form, (3) Understanding the word's meaning, (4) Remembering or Consolidating a word's form and meaning in memory, and (5) Using the word actively (as in one's speech or writing).

The following 3C method is mentioned by Hatch and Brown, to which we would add two other 'Cs' for more complete learning of new vocabulary. This is derived from Seal's (1991) study, entitled "Vocabulary Learning and Teaching." It proposed at least these three Cs be covered even in informal or spontaneous teaching of new words: (1) Convey the new word's meaning, (2) Check on its meaning, (3) Consolidate the meaning. In addition to these three Cs, however, I propose adding two more important points if at all possible, as follows. Teachers should also try to (4) Clarify the word's form and usage (grammatically, structurally, sociolinguistically), and (5) Connect it within one's memory bank (help students fix it in memory via active, multisensory use, at least by writing or speaking it within an original sentence). Such generative or productive use has been found to be

necessary in order for new words and concepts to move from merely passive recognition into one's active vocabulary (See Nation, 1994b).

FUTURE RESEARCH AREAS AND RECOMMENDATIONS

New technology can help to make language learning more fun, informal, and accessible at any location where bilingual broadcasts, multilingual videos or CDs, computerized software, electronic dictionaries, or electronic mail exist. These kinds of equipment and facilities will make language learning increasingly more effective, efficient, and hopefully also more enjoyable in the years to come. But before constructing any English reading or vocabulary curriculum, especially for learners of English as a Second or Foreign Language (ESL/EFL), the following summary of recommendations based upon this extensive study in Japan should be carefully considered.

Students who become motivated enough to learn another language well seem to master L2 vocabulary acquisition skills as well as reading and listening comprehension strategies along their rough, spiraling climb to language mastery. Fluent L2 readers, in turn, appear to gain the following essential language development skills: (1) ABILITY TO PROCESS L2 TEXTS USING INTENSIVE READING SKILLS, such as skimming, scanning, and speedreading, strategies successfully; (2) EXTENSIVE READING SKILLS, which enable them to enjoy reading in another language as a life-long habit; (3) INCREASINGLY HIGHER LEVELS OF COMPREHENSION of both reading and listening contexts; (4) GROWING LINGUISTIC COMPETENCY, giving greater ability to process semantic, syntactic, and contextual relationships within texts at increasing levels of speed and accuracy; (5) HIGHER LEVELS OF SECOND LANGUAGE ACQUISITION OR FLUENCY, which are needed for both (a) more advanced academic learning in English, (b) better balanced bilingualism, which is the ultimate or ideal goal of Second Language Acquisition (SLA), (c) better ability to translate between L1 and L2, and especially (d) a broader and richer vocabulary, which becomes the strong foundation upon which higher levels of communicative competence can be built naturally. This can be done to the degree that these areas of linguistic ability are integrated with the more productive language skills of speaking and writing through active use. These seem to be the essential steps by which fluency in a second language, or actual SLA, is attained.

Future research should focus on each specific area of language development, just as this study has helped to focus on the vital role that mastering vocabulary learning skills and strategies plays in gaining English proficiency (or SLA) among Japanese college students. The following factors should be considered in any future studies attempting to isolate factors which help facilitate more rapid learning of the target or second language vocabulary: 1) Student's initial reading levels, as well as both their vocabulary and comprehension levels relative to native reader norms, 2) Level of instructional materials, to be sure they fit the individual student's actual English reading instructional level, 3) Rate of presentation, number of presentations in different contexts, variety of instructional media and manner in which vocabulary-learning strategies are taught and practiced, 4) Students' degree of familiarity with the background knowledge necessary to understand the context of given reading passages, 5) Students' ability to anticipate and concentrate on the task of learning new word

meanings. 6) Students' reading speed and knowledge of various reading strategies and reasoning skills, as well as patterns of textual organization needed to comprehend correctly. 7) Aim to maximize both vocabulary acquisition as well as its activation by giving students as many chances as possible to *use new semantic meanings* as well as new syntactical structures in actual language tasks involving target language (TL) production. Decide beforehand which words should be targeted for active vocabulary use versus those which may be only learned and added to passive vocabulary. 8) What teaching and learning practices help to better integrate words learned in second language reading or listening classes into more active use in other communication skill areas? 9) What types of dictionaries and dictionary skills do students need, use and possess? Find out what percentage of the words taught in junior and senior high are still remembered by students upon entrance into college. How can this percentage and number of words be increased, and put to more communicative use earlier in Japanese students' educational experience? Encourage more intensive use of monolingual or bilingual dictionaries depending on individual student need and level, computerized if at all possible, for more rapid and portable accessing of meanings and collocations. Finally, let us consider 10) How can more CAI software and CD-ROM English data banks, dictionaries, and language activities be brought into wider and more extensive use across the country to help students to become more bilingual, and the country to become more internationalized at a faster pace than at present?

All of the above are very important factors to consider, not only when doing research studies, but also when designing and evaluating the vocabulary component of any ESL/EFL Program. Nation (1994a: vi) suggests these seven guiding questions to use, which we did:

1) Does the teacher know what the learners' vocabulary level [s] and needs are? [Do students?]
2) Is the program focusing appropriately on the appropriate level of vocabulary?
3) Is the vocabulary helpfully sequenced?
4) Are the skill activities designed to help vocabulary learning?
5) Is there suitable proportion of opportunities to develop fluency with known vocabulary? [Are there chances to transfer new words into active use?]
6) Does the presentation of vocabulary help learning [of content area material]?
7) Are the learners excited [and informed] about their progress? [Finally, is there enough individualized immediate feedback for both proper educational diagnosis and prescription?]

PRACTICAL RECOMMENDATIONS FOR TEACHING L2 READING

Several important factors necessary for developing reading proficiency in a second language seem to be suggested by this study. These factors could also prove to be good predictors of success in second language acquisition, upon further study. They include: (a) ability to concentrate, (b) ability to anticipate contextually appropriate vocabulary and structure when reading or listening to discourse, (c) L2 vocabulary level, learning strategies and rate of both exposure and improvement or acquisition, (d) speed and accuracy of comprehension, (e) thinking and reasoning skills, (f) knowledge of English grammar and rhetorical organization of written discourse, (g) degree and type of language-

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learning motivation, (h) levels of skill or fluency in each area of communication. In short, these reading skills and strategies need to be taught more: (1) intensively, (2) explicitly, (3) interactively, and also (4) be integrated with other communication skill areas. Reading researchers tend to divide the complex skills used in reading into six areas: 1) Automatic recognition skills, 2) Vocabulary and structural knowledge, 3) Formal discourse structure knowledge, 4) Content/world background knowledge, 5) Synthesis and evaluation skills/strategies, 6) Metacognitive knowledge and skills monitoring (Grabe, 1992: 379).

Many excellent suggestions are given by Nation for vocabulary training activities, as well as ways in which teachers can better look for and include these important factors in ESL/EFL learning. Language teachers must become more aware of the importance of helping language learners to rapidly develop specific reading and listening strategies along with expressive skills, and aim to use CAI for more innovative and intensive vocabulary and language education. When evaluating the vocabulary component of an ESL/EFL program, three areas should be considered: (1) what to look for, (2) how to look for it, and (3) how to include it in a more effective vocabulary instruction and learning program. These three areas can be a good basis for such evaluation, to help teachers develop a more effective ESL/EFL vocabulary development program. Though there are many important areas to consider when one contemplates vocabulary development in an ESL/EFL program, six major components given below are crucial (Nation, 1994a: v).

1) Meeting new vocabulary for the first time--Besides meeting new words in formal class presentations, language learners most often meet new vocabulary through extensive reading and extensive listening activities. Extensive exposure to language through a wide variety of reading and listening/viewing experiences is the best way to broaden one's vocabulary knowledge. Language scholars note that the majority of an individual's vocabulary knowledge is gained indirectly through reading and listening, meaning that the more one reads, the broader one's vocbaulary will tend to become. L2 students must be helped to distinquish what is "essential vocabulary," such as basic idioms and prefixes. They must also learn how to find collocations in an English-English dictionary, how to activate receptive or recognized vocabulary, and how to guess or ignore unimportant or infrequent words. Extensive reading by definition encourages broader reading for pleasure. As Nation characterizes it (1994a: vi-vii), "During extensive reading, including reading of simplified texts or graded readers, new words should not be met at a rate greater than one or two new words per hundred known running words if learners are to gain pleasure from reading" [similar to their Independent Reading Level]. One can combine this recommendation with Betts' (1946) three reading levels to design three "Reading Level Guidelines for ESL/EFL Students," namely I. Independent Level--Only 1-2 new words per 100 words of text, II. Instructional Level--Only 3-5 new words per 100 running words, and III. Frustration Level--Avoid more than 5 unknown words/100.

2) Establishing Previously Met Vocabulary--Beyond first meeting with new words, language learners especially need repeated meetings with new words both in order to fix the new meanings into their passive vocabulary memories, and also to add these new meanings to their active vocabularies through actual expressive use. The teacher or vocabulary materials developer needs to build spaced

repetition of target vocabulary into the course materials.

3) Enriching previously met vocabulary--Because there are so many things to learn about any new word, teachers need to help students distinguish between infrequent, less important words that can be guessed from context or given in a note, and frequent, important new words to learn by preselecting them for study or review. A variety of new contexts is best for learning and fixing important new word meanings into one's long-term memory.

4) Developing vocabulary strategies--When students begin to learn a foreign language, they should be taught both word-decoding skills and also vocabulary recognition skills. It is only upon these foundational building blocks that any comprehension and critical reasoning skills can be built. Far too many Japanese students have not developed fluent phonetic skills or sufficient vocabulary necessary to be able to read orally with any degree of natural expression or fluency, or silently with an adequate speed or rate necessary for comprehending academic English. As Nation (1994a:viii) suggests, language learners need "to be able to use strategies to cope with unknown vocabulary met in listening or reading texts, to make up for gaps in productive vocabulary in speaking or writing ... gain fluency in using known vocabulary ... to learn new words in isolation."

5) Developing fluency with known vocabulary--The key to developing fluency in another language seems to be to *maximize opportunities for active and meaningful use of new vocabulary in actual communicative tasks*. These language learning tasks should stress the exchange of actual meaning in active communication, but not be too difficult intellectually. Finding the proper balance between language learning goals and course content objectives is a constant challenge for those teaching English for academic or special purposes. Nevertheless, the level, interest, and ability of each student must first be ascertained, and then always kept in mind to help them make maximum progress. In the end, even vocabulary learning is an individual thing, with each student having a different word bank and level of reading and vocabulary strategy skills. But unless teachers actively teach and test these skills, language learners will continue to be deprived of the most important tools for language development. Learners' growth in any target language vocabulary clearly can only become optimum if they are given maximum opportunities to become fluent with that vocabulary. "This fluency can be partly achieved through activities that lead to the establishment and enrichment of vocabulary knowledge, but the essential element in developing fluency lies in the opportunity for meaningful use of vocabulary in tasks with a low cognitive load." (Nation, 1994a:viii)

6) Integrate the development of core vocabulary and reading skills throughout any English educational curriculum program. As Nation (1994a:viii) strongly emphasizes, "Vocabulary learning is not an end in itself. A rich vocabulary makes the skills of listening, speaking, reading, and writing easier to perform." Focus intentionally on more advanced words on EAP lists (see Thrasher, 1997). Beyond using the benefits of Computer-Assisted Instruction (CAI) to help ESL/EFL students to more rapidly expand their target language (TL) vocabulary, ACTIVE, PRODUCTIVE, and EXPRESSIVE USE of new terms and phrases must be stressed. Since the key to developing fluency in another language involves using the TL in actual communicative tasks, language teachers should emphasize

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learning tasks which stress the exchange of actual meaning in active communication as much and as often as possible.

There are a broad range of activities which can be done to help language learners to develop their own English reading skills. In particular, both vocabulary development and comprehension learning strategies should be taught as much as possible. Rather than merely rote, unthinking memorization of words lists, teacners can encourage more productive use of new vocabulary by "requiring retelling a written story from a different focus [for example, by using a different grammatical tense or person], by distributing the information in a way that encourages negotiation [of new meanings], and by requiring learners to reconstruct what was in the text rather than [merely] repeat it." (Nation, 1994b). Learning mere lists of translation equivalents might even delay the process of establishing new semantic networks in a foreign language. Gairns and McCarthy (1988) found that "Students are far more likely to retain vocabulary if they are actively involved in a meaningful task which involves some kind of semantic processing and also provides a unifying theme to facilitate organization in the memory," such as requiring them to redistribute the information in a way that encourages negotiation of new meanings.

Since most new vocabulary is learned from context, whether directly through formal teaching and study, or indirectly and informally, teachers should aim to expose students to as broad a variety of different language contexts as possible. Depending on learners' needs, some balance of recognition and productive skills should be developed, using the benefits of modern technology to integrate all four language skills together in a growing spiral of complexity which helps students to gradually build up their TL fluency. Vocabulary development is so crucial that it should be an integral part of all language classes, not just reading. Reading teachers in Japan need to gain the skills necessary to better diagnose and prescribe according to individual student's needs. They should be able to assess the size of a given language learner's vocabulary knowledge, whether according to native-normed reading level tests, or by number of headwords.

Next, as language teachers we should consider what kind of activities need to be designed to draw students' attention to more active acquisition, activation and retention of new semantic and syntactical forms and meanings. In other words, "... both direct and indirect vocabulary activities need to be selected carefully and implemented as part of a course's design. Both ... are essential for establishing new vocabulary and expanding the learners' word associations. Finally, attention should be given to improving the rate of access to words in order to improve reading fluency." (Beglar & Hunt, 1995)

Clear pedagogical implications for ESL/EFL vocabulary development based upon this present study, as well as these other recent findings, would be that a variety of multimedia-assisted instructional materials, and a broader range of more interactive and communicative learning activities can certainly help to develop language learners' vocabulary more intensively, rapidly, effectively, and enjoyably. Supporting the use of a variety of such vocabulary-training activities, Mangunn (1990) says that "Students need to engage in meaningful tasks and do things with words. Learner engagement in such activities will come through self-discovery, peer-learning, and enjoyable practice of vocabulary."

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CONCLUSION

This has been just a brief synopsis of a very long dissertation in a much-needed field having many important pedagogical implications for college and secondary teachers of English in Japan. All three approaches to vocabulary instruction in the EFL classroom helped students to develop their word knowledge more intentionally, and can show us some very important principles to keep in mind in order to improve both the teaching and learning of English vocabulary-building skills. The core of research findings regarding vocabulary acquisition is the same, namely that five steps seem to be essential to learning any new words or phrases in any language. Since they are such important steps, they should be known and practiced by language teachers and students as much and as often as possible. Since one major goal of empirical science is to quantify principles that are observed or discovered in mathematically precise terms, the following operational definition of how new vocabulary learning seems to take place can now be offered. "Total Vocabulary Acquisition" (one may use TVA for short) Equals Maximization of Steps 1-5 above. Therefore one may also suggest that maximum TVA can be achieved by helping language learners to master and use as intensively as possible this total process, which seems to be present in all new vocabulary learning. If teachers can help their students to "Maximize Vocabulary Acquisition" while also "Maximizing Grammar Activation" through "Maximized Productive Active Use" of English communication skills, language learners can thereby be helped to achieve "Maximum Second Language Acquisition." Naturally, helping students to increase their semantic learning, multiplied by more frequent receptive exposure and active use of English or any spoken Target Language in a broader variety of syntactical textual and contextual situations should clearly help them to more rapidly reach SLA's ideal goal of optimal fluency. A thorough consideration of these educational principles and recommendations should help to maximize EFL/ESL learning.

To conclude very clearly and concisely, language learners will learn new vocabulary when they are taught how to apply these three principles:

A. ACCESS and ACQUIRE new word forms and meanings. B. ATTEND and ASSOCIATE these new word forms and meanings with previous background knowledge, or learn new cultural and conceptual schemata or organizational frameworks for using them. Finally, C. ACTIVATE and APPLY new vocabulary in ACTUAL PRODUCTIVE USE. Students must be helped to maximize these learning steps. Finally, these principles are most significant for both linguistic theory and educational practice, since they seem to summarize how to help maximize vocabulary development for new language learners. Maximizing a student's TVA= (or can be best accomplished by) Maximizing Steps 1-5 and the Five Cs given above. This means or entails more specifically that a language learner can best maximize his TVA by increasing the total amount of new words, phrases and structures that he can funnel through each of these steps of vocabulary acquisition shown above. If language teachers were to really focus and capitalize on the implications of this principle, it could help to create revolutionary gains in their students' vocabulary acquisition rates and levels, both individually, and also in the field of foreign language education as a whole.

In sum, this study and a growing body of SLA/EFL research shows that vocabulary and English education in Japan should be 1) more

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interactive or communicative, 2) more intensive, 3) more well-integrated (as the Language Experience and Whole Language Approach has always claimed), 4) more intentional, 5) more individualized, with 6) more immersion or exposure, 7) more international content 8) more internalization, 9) more immediate feedback, 10) more interdisciplinary learning, and be 11) more innovative, and 12) more intimately connected with student's lives and real-world issues (as calls for "relevance, authenticity, and global education for world citizenship" have been claiming all along).

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